
Vascular Access: Achille's Heel of Hemodialysis

Damanhour Annual Meeting 2013

Professor Meguid El Nahas, PhD, FRCP

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Sheffield, UK



Barriers to Optimal Vascular Access

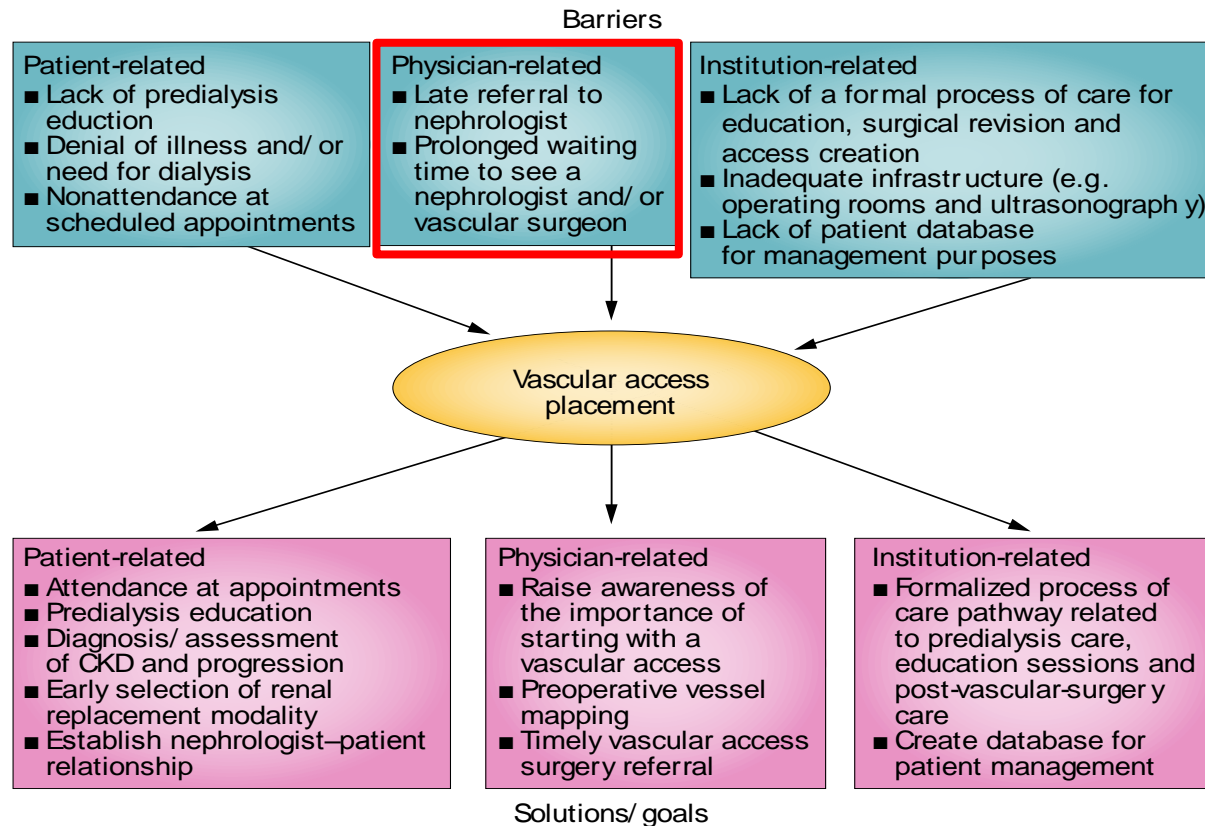


Figure 3 | Barriers and solutions for vascular access placement. Based on the recommendations of Lopez-Vargas, P. A. *et al.*¹²³ and Lee, T. *et al.*¹⁷
Abbreviation: CKD, chronic kidney disease. Permission obtained from Elsevier © Lopez-Vargas, P. A. *et al. Am. J. Kidney Dis.* 57, 873–882 (2011).¹²³

CKD in Emerging Countries:

The Real Problem

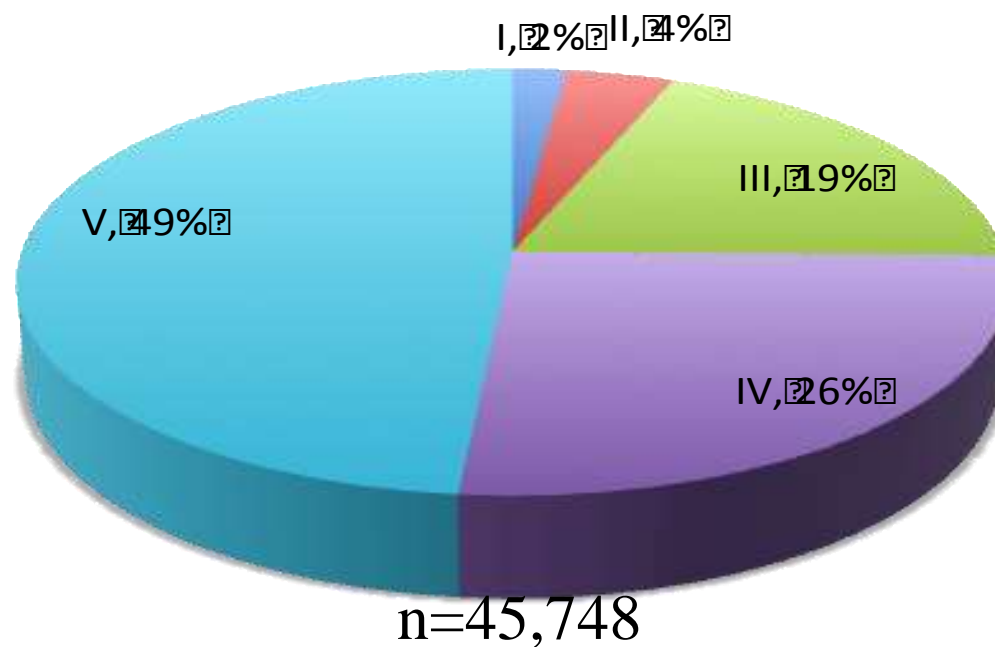
Not the EARLY DETECTION of CKD1-2

BUT

The EARLY REFERRAL of CKD3

CKD stages at presentation

Indian CKD Registry



Barriers to Optimal Vascular Access

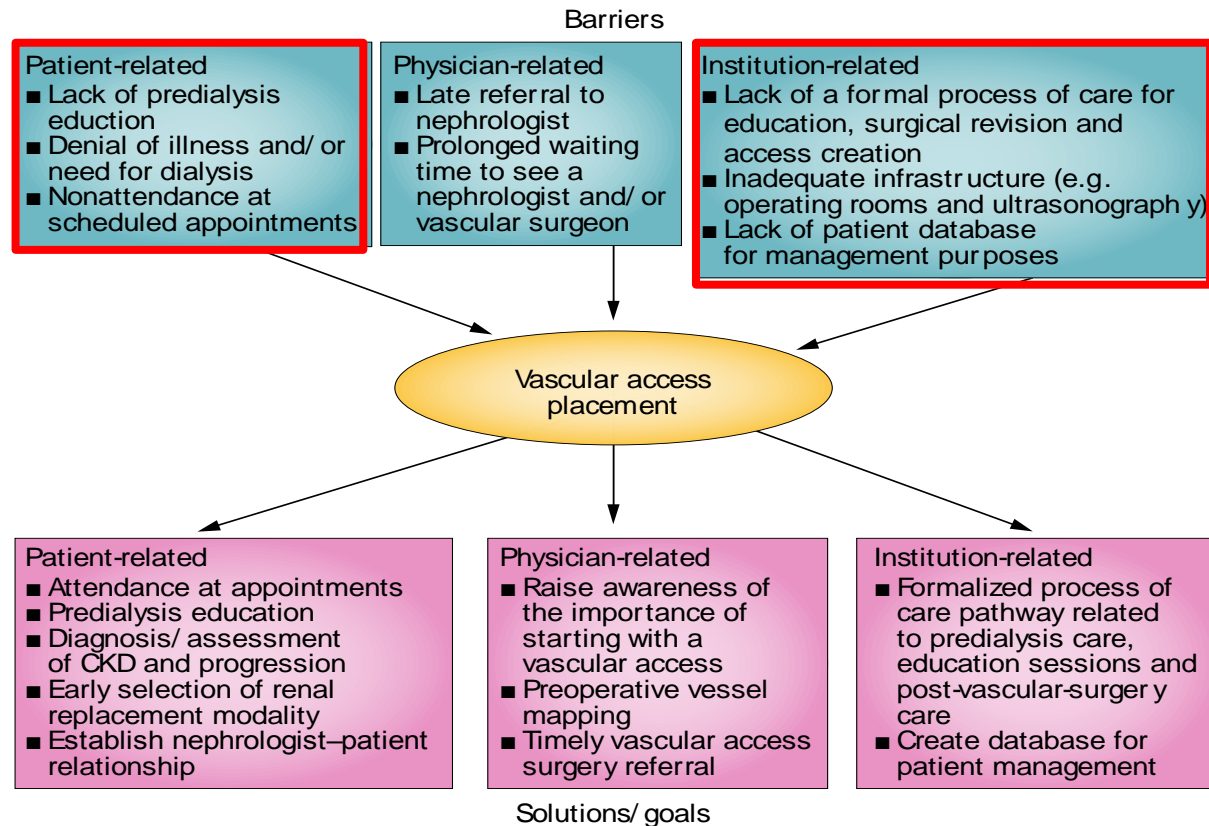


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Pre-Dialysis Clinics/Consultation

Multi-Disciplinary Approach to ESRD

Nephrologist

Surgeon

Nurse Specialist

Radiographer

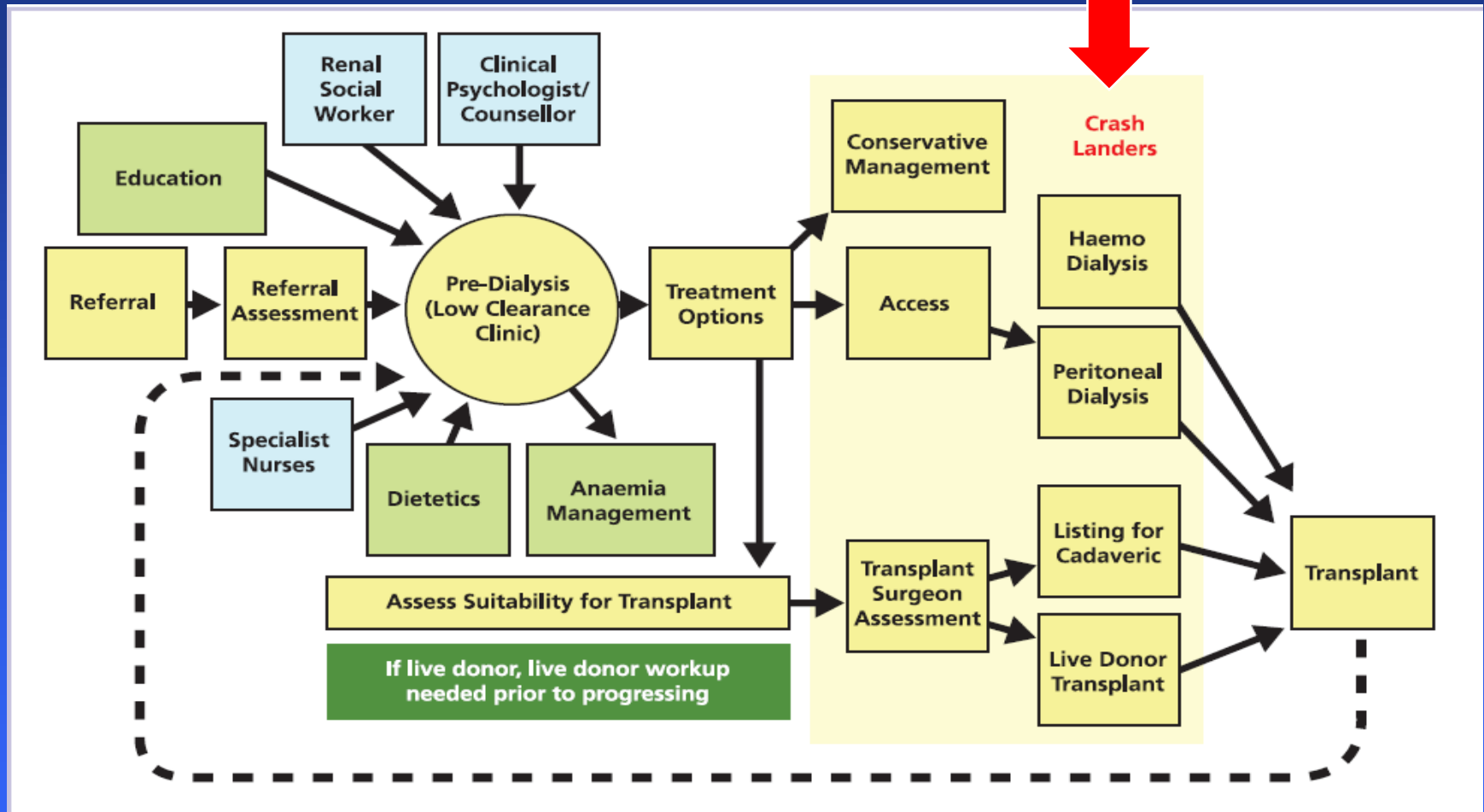
Nurse Counsellor

Transplantation Counsellor

Dietitian

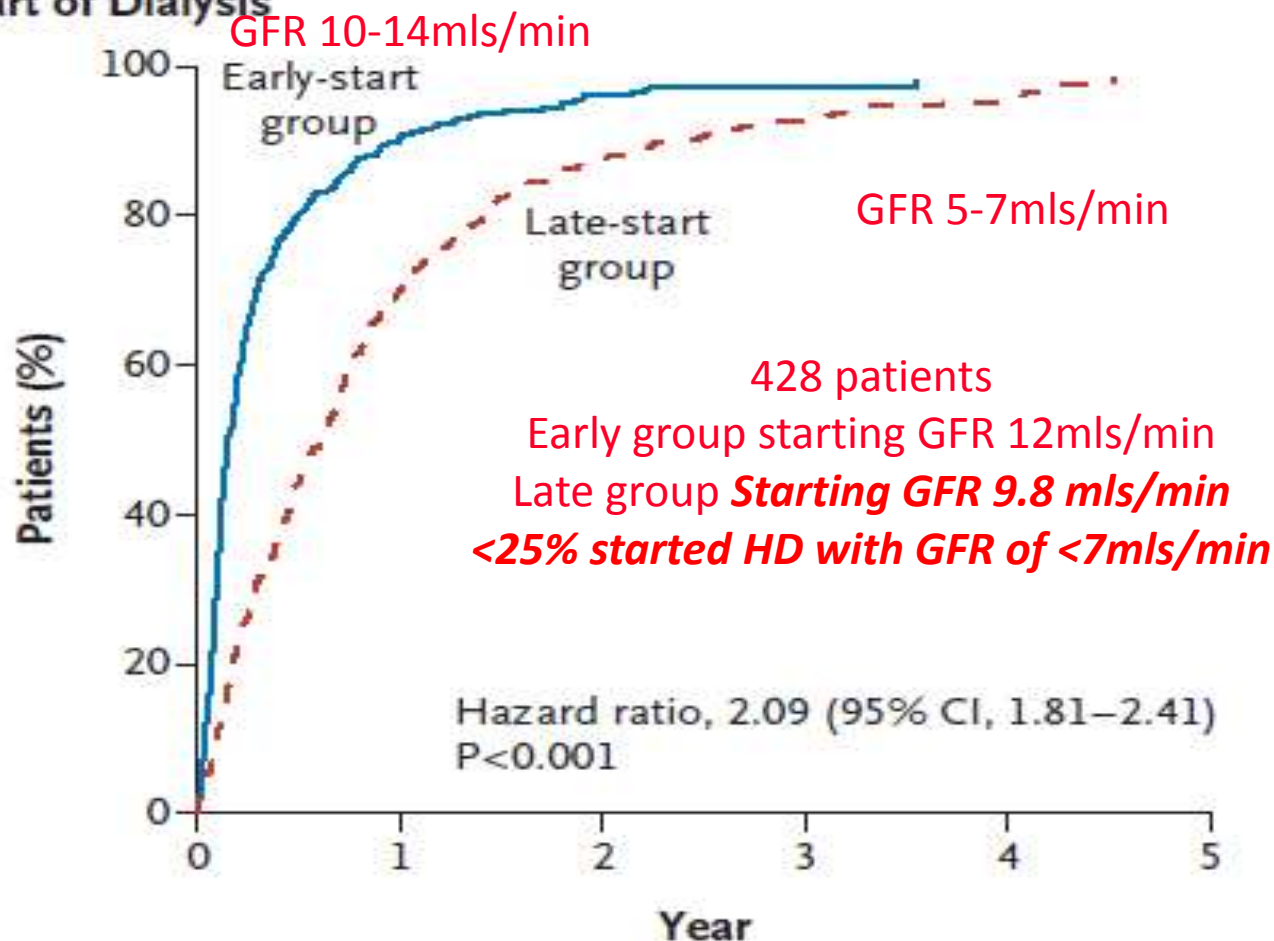


Pre-RRT Pathway



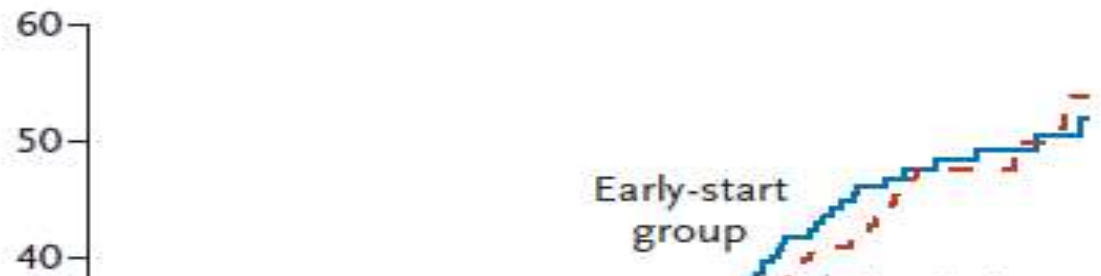
Early vs Late Start dialysis – IDEAL study

A Time to Start of Dialysis

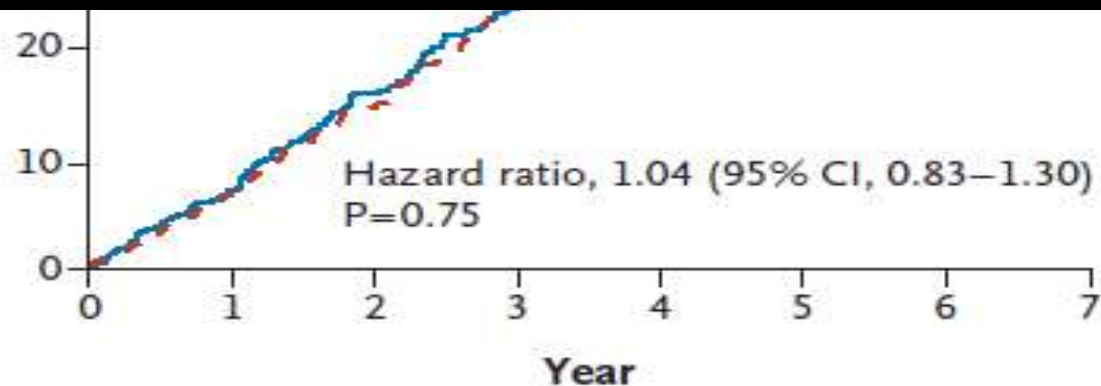


Early vs Late Start dialysis – IDEAL study

B Time to Death



This study emphasises the need for good predialysis care not late starting!! Most people will develop symptoms when GFR between 8-10



Barriers to Optimal Vascular Access

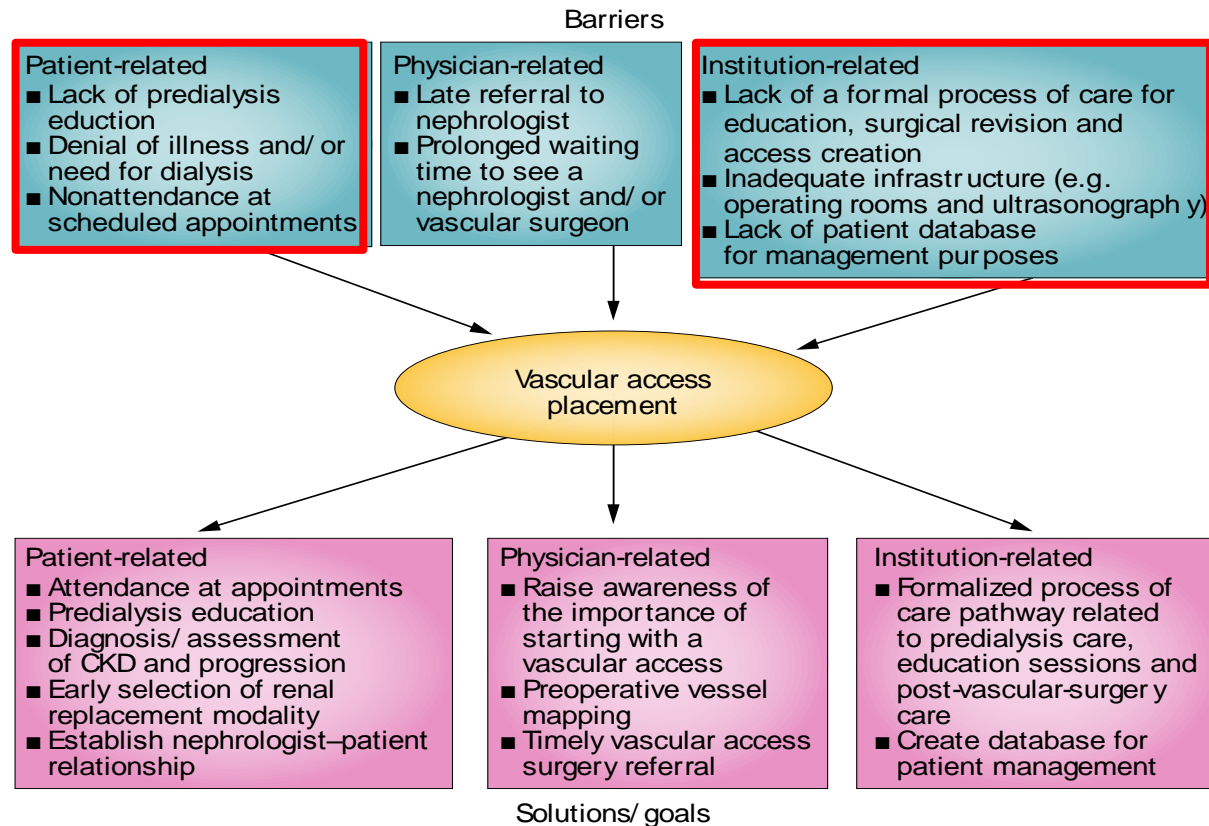


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FFI

Fistula First Initiative: Advantages and Pitfalls

Charmaine E. Lok

Department of Medicine, Division of Nephrology, Toronto General Hospital, Toronto, Ontario, Canada

Clin J Am Soc Nephrol 2: 1043-1053, 2007. doi: 10.2215/CJN.01080307

GOALS

Incident AVF:....

Prevalent AVF:....



Fistula First Initiative: Advantages and Pitfalls

Charmaine E. Lok

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K/DOQI GOALS

Incident AVF: 50%

Prevalent AVF: 40%



Fistula First Initiative: Advantages and Pitfalls

Charmaine E. Lok

Department of Medicine, Division of Nephrology, Toronto General Hospital, Toronto, Ontario, Canada

Clin J Am Soc Nephrol 2: 1043-1053, 2007. doi: 10.2215/CJN.01080307

2009 Revised GOALS

Incident AVF: 50%

Prevalent AVF: 65%

CVC: <10% !!!



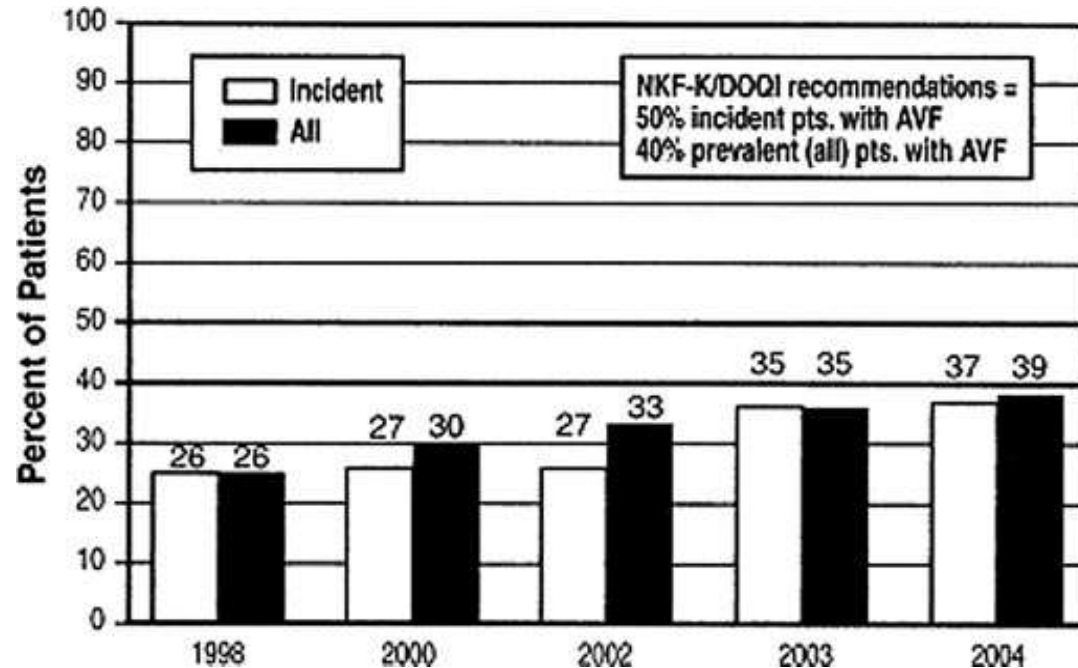
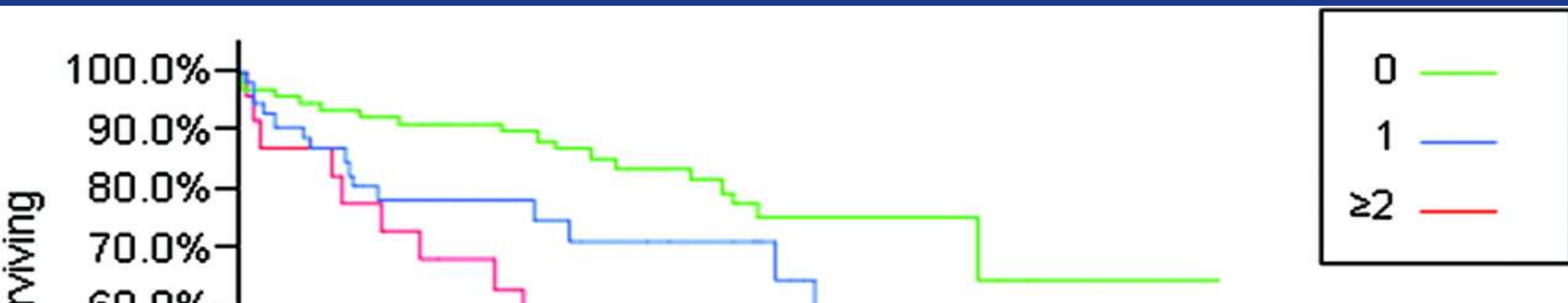


Figure 2. Percentage of adult in-center hemodialysis (HD) patients (all and incident) who underwent dialysis with an arteriovenous fistula (AVF) as their vascular access on their last HD session during October through December 2004 compared with previous study periods. 2005 ESRD CPM Project. Reprinted from reference (15), with permission.

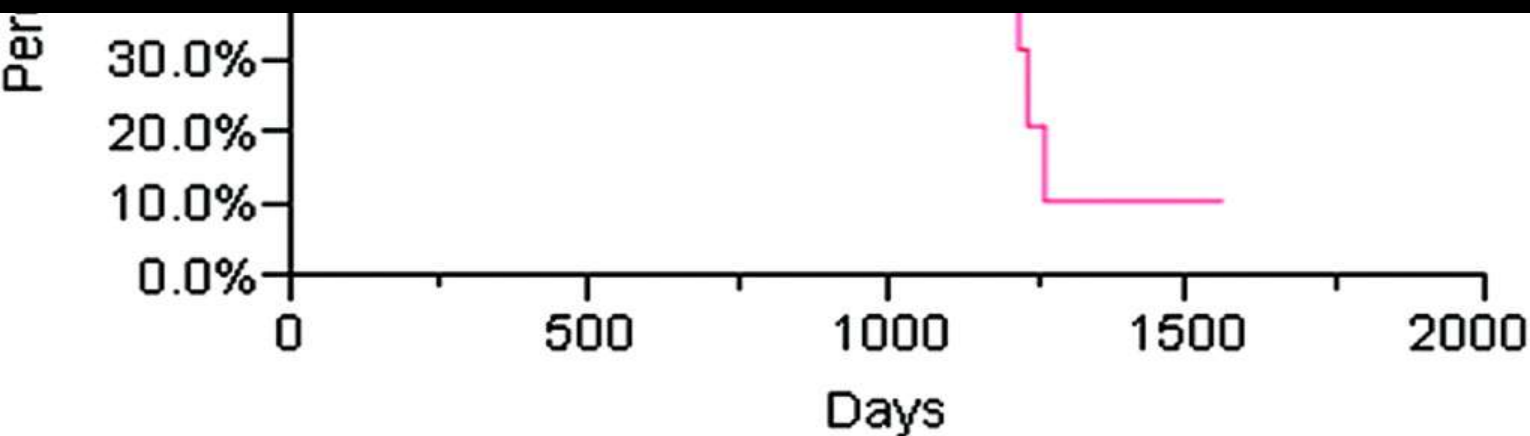
However, creating fistulas may not be the critical challenge. The true challenge is achieving 65% *functioning* fistulas in today's dialysis patient. Several decades ago, AVF had acceptable primary failure rates of approximately 10% (16–19) and 1-yr primary patency rates between 70 and 80%. Now, primary failure rates range between 30 and 70% and have primary patency rates of 40 to 70% (20–24). Primary failure is due to early thrombosis and failure of the fistula to mature (FTM). The



Cumulative access survival by number of interventions before manipulation



Those who need more interventions are more likely to fail. Maybe benefit in more aggressive surveillance of these fistula



Too Many CVC

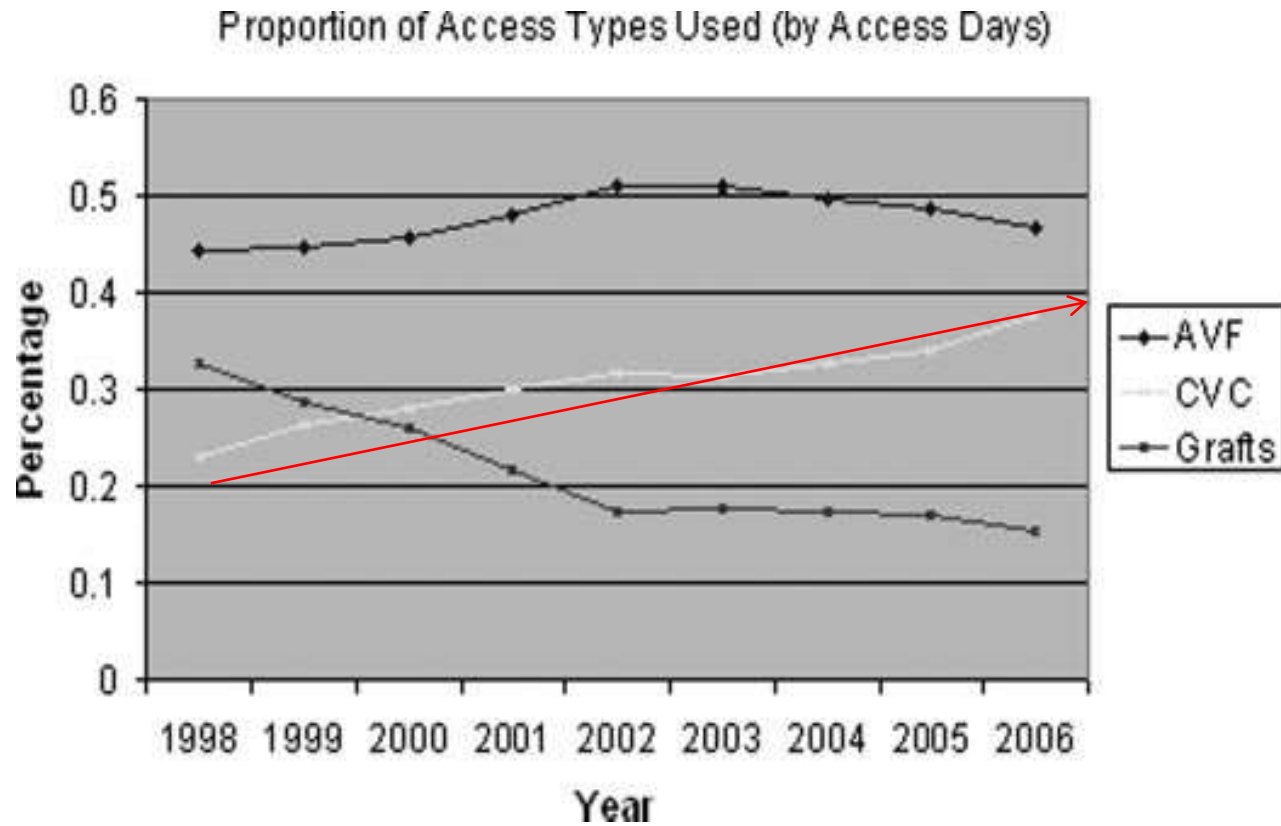


Figure 4. Trend in access use in a university-based hospital.

Associations between Hemodialysis Access Type and Clinical Outcomes: A Systematic Review

Pietro Ravani,^{*†‡} Suetonia C. Palmer,[§] Matthew J. Oliver,^{||} Robert R. Quinn,^{*†‡} Jennifer M. MacRae,^{*} Davina J. Tai,^{*¶} Neesh I. Pannu,^{**} Chandra Thomas,^{*} Brenda R. Hemmelgarn,^{*†‡} Jonathan C. Craig,^{†‡‡§§} Braden Manns,^{*†‡} Marcello Tonelli,^{**} Giovanni F.M. Strippoli,^{‡‡§§|||¶¶} and Matthew T. James^{*†‡}

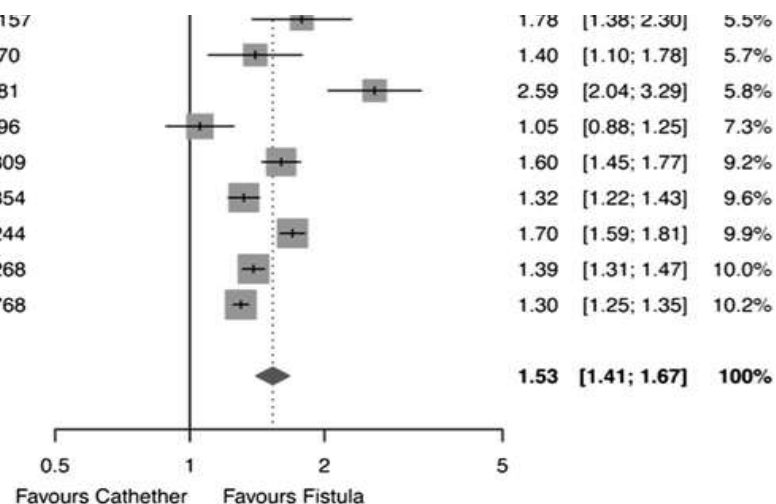
Departments of ^{*}Medicine and [†]Community Health Sciences and [‡]Libin Cardiovascular Institute of Alberta, University of Calgary, Calgary, Alberta, Canada; [§]Department of Medicine, University of Otago Christchurch, Christchurch, New Zealand; ^{||}Department of Medicine, University of Toronto, Toronto, Ontario, Canada; [¶]Department of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada; ^{**}Department of Medicine, University of Alberta, Edmonton, Alberta, Canada; ^{††}Clinical Research Centre for Kidney Research, The Children's Hospital at Westmead, Westmead, Australia; ^{‡‡}National Health and Medical Research Council Centre for Clinical Research Excellence in Renal Medicine, Cochrane Renal Group, Sydney, Australia; ^{§§}School of Public Health, University of Sydney, Sydney, Australia; ^{|||}Laboratory of Clinical Epidemiology of Diabetes and Chronic Diseases, Mario Negri Sud Consortium, S. Maria Imbaro (Chieti), Italy; and ^{¶¶}Diaverum Medical Scientific Office, Lund, Sweden



Foley 2009	Incident Patients	220157		1.78	[1.38; 2.30]	5.5%
Pastan 2002	Prevalent Patients	2470		1.40	[1.10; 1.78]	5.7%
Polkinghorne 2004	Prevalent & Incident Patients	3381		2.59	[2.04; 3.29]	5.8%
Wasse 2008	Incident Patients	4196		1.05	[0.88; 1.25]	7.3%
Moist 2008	Incident Patients	14809		1.60	[1.45; 1.77]	9.2%
Pisoni 2009	Prevalent & Incident Patients	12854		1.32	[1.22; 1.43]	9.6%
Xue 2003	Incident Patients	44244		1.70	[1.59; 1.81]	9.9%
Lacson 2009 A	Prevalent & Incident Patients	46268		1.39	[1.31; 1.47]	10.0%
Lacson 2009 B	Prevalent & Incident Patients	57768		1.30	[1.25; 1.35]	10.2%

Pooled RR

Heterogeneity: $I^2=83.1\%$, $Q=106.6$, $df=18$, $p<0.0001$



Krzanowski 2011	Prevalent & Incident Patients	32		1.60	[0.26; 9.85]	0.3%
Inrig 2006	Prevalent & Incident Patients	106		1.53	[0.31; 7.53]	0.4%
Astor 2005	Incident Patients	531		1.21	[0.70; 2.09]	2.6%
Polkinghorne 2004	Prevalent & Incident Patients	1491		1.67	[1.15; 2.43]	4.5%
Dhingra 2001	Prevalent Non-diabetics	2613		1.58	[1.10; 2.27]	4.6%
Dhingra 2001	Prevalent Diabetics	1281		1.09	[0.77; 1.54]	4.9%
Allon 2006	Prevalent Non-diabetics	1012		2.08	[1.52; 2.85]	5.5%
Allon 2006	Prevalent Diabetics	814		3.11	[2.31; 4.19]	5.8%
Foley 2009	Incident Patients	220157		1.28	[0.98; 1.67]	6.5%
Pastan 2002	Prevalent Patients	5888		1.30	[1.10; 1.54]	9.1%
Wasse 2008	Incident Patients	4228		1.08	[0.94; 1.23]	10.1%
Pisoni 2009	Prevalent & Incident Patients	6304		1.15	[1.03; 1.28]	10.6%
Lacson 2009 B	Prevalent & Incident Patients	57768		1.30	[1.25; 1.35]	10.2%

Fistula First!

Fistula First!

1. Timed AVF
2. Quality of AVF
3. Needling
4. Medication

Box 3. Suggestions to Address Patient Resistance to AV Fistulas

- Start discussing AV fistulas with patients with CKD stages 4-5 before dialysis therapy is initiated
- Educate patients about the infection risk and other practical issues associated with catheter use
- Identify and treat anxiety and depression in affected patients
- Use topical anesthetic to reduce the pain associated with cannulation
- Use relaxation or distraction techniques to reduce anxiety during cannulation
- Teach patients to self-cannulate
- Consider using the buttonhole technique for cannulation

Abbreviations: AV, arteriovenous; CKD, chronic kidney disease.

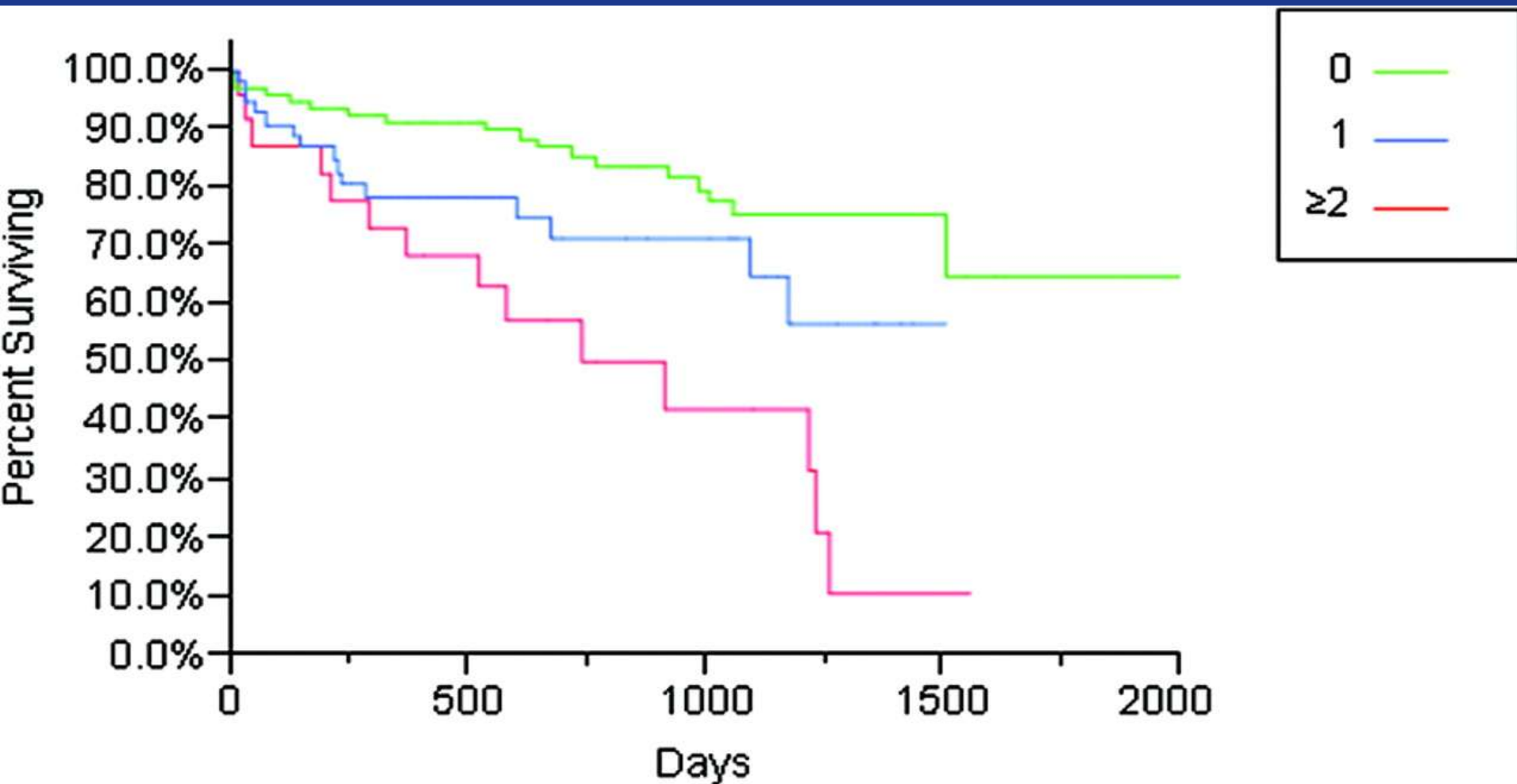
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Cumulative access survival: Number of interventions before manipulation



Fistula First!

1. Timed AVF
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4. Medication

Button Hole v Rope Ladder

OBJECTIVES: Compare buttonhole cannulation with rope ladder

RESULTS:

- Infection at the cannulation site occurred in four patients in the buttonhole group and one in the rope ladder rotation group ($p = 0.11$).
- Haematomas at the cannulation site and site pain experienced during the dialysis session were more often recorded for the buttonhole group ($p < 0.05$).

CONCLUSIONS:

- This study showed that ***buttonhole cannulation resulted more infections, haematoma formation and site pain during dialysis than with the rope ladder rotation group.*** A further larger scale longitudinal study is recommended.



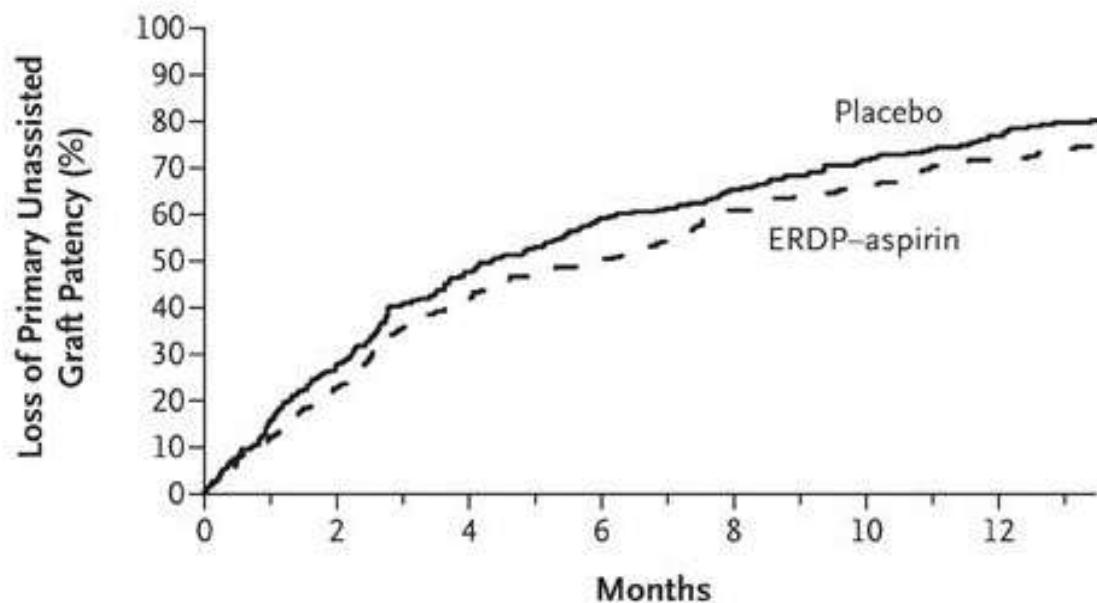
Chow J et al 2011



Fistula First!

1. Timed AVF
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Dipyridamole-Aspirin extends graft patency



No. at Risk

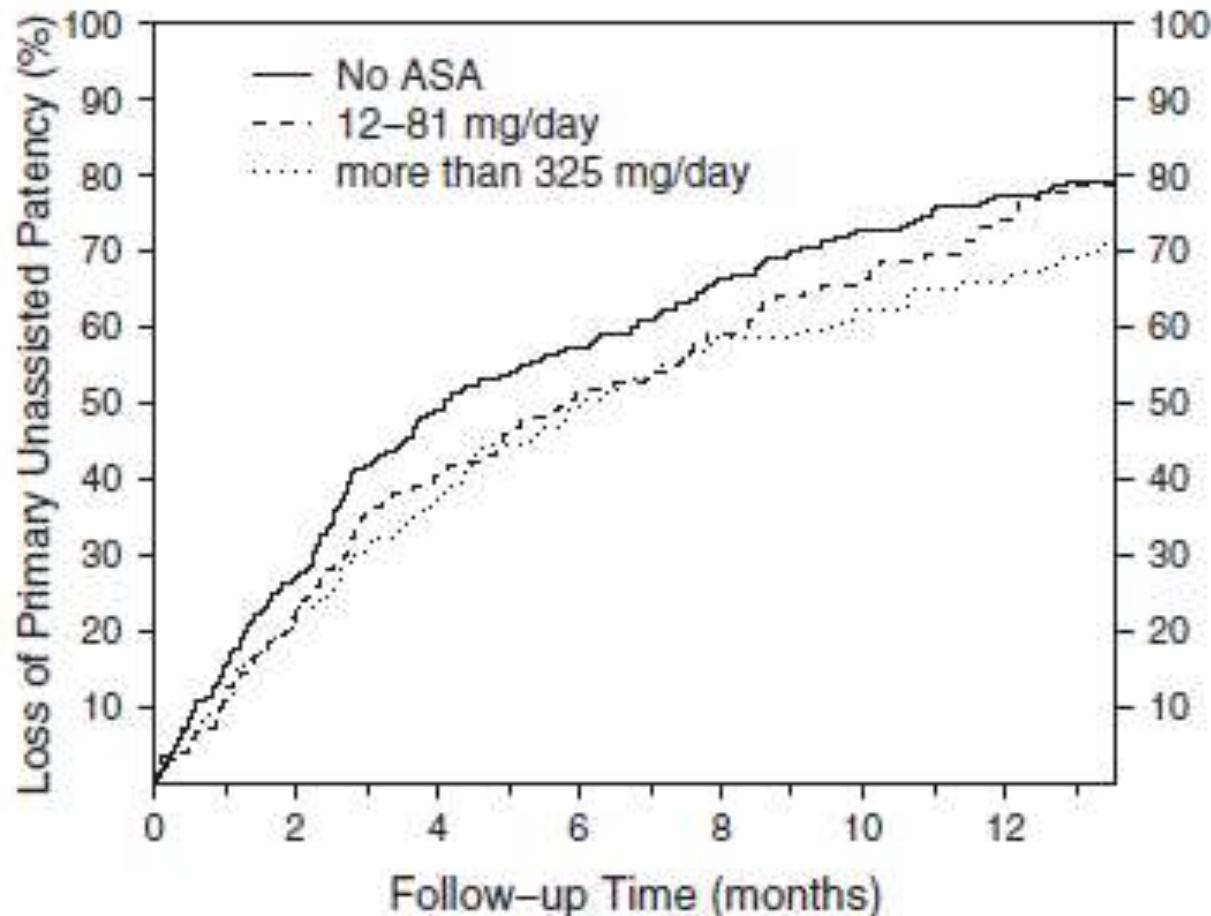
ERDP-aspirin	321	236	171	146	108	88	69
Placebo	328	236	162	119	94	74	56

Median duration of
graft patency

5.8 vs 4.3 months

$P < 0.03$

Aspirin use associates with longer graft patency



This work is on the background that Aspirin/Dipyridamole prolongs graft survival

HR 0.76 (0.59-0.99)
P=0.04

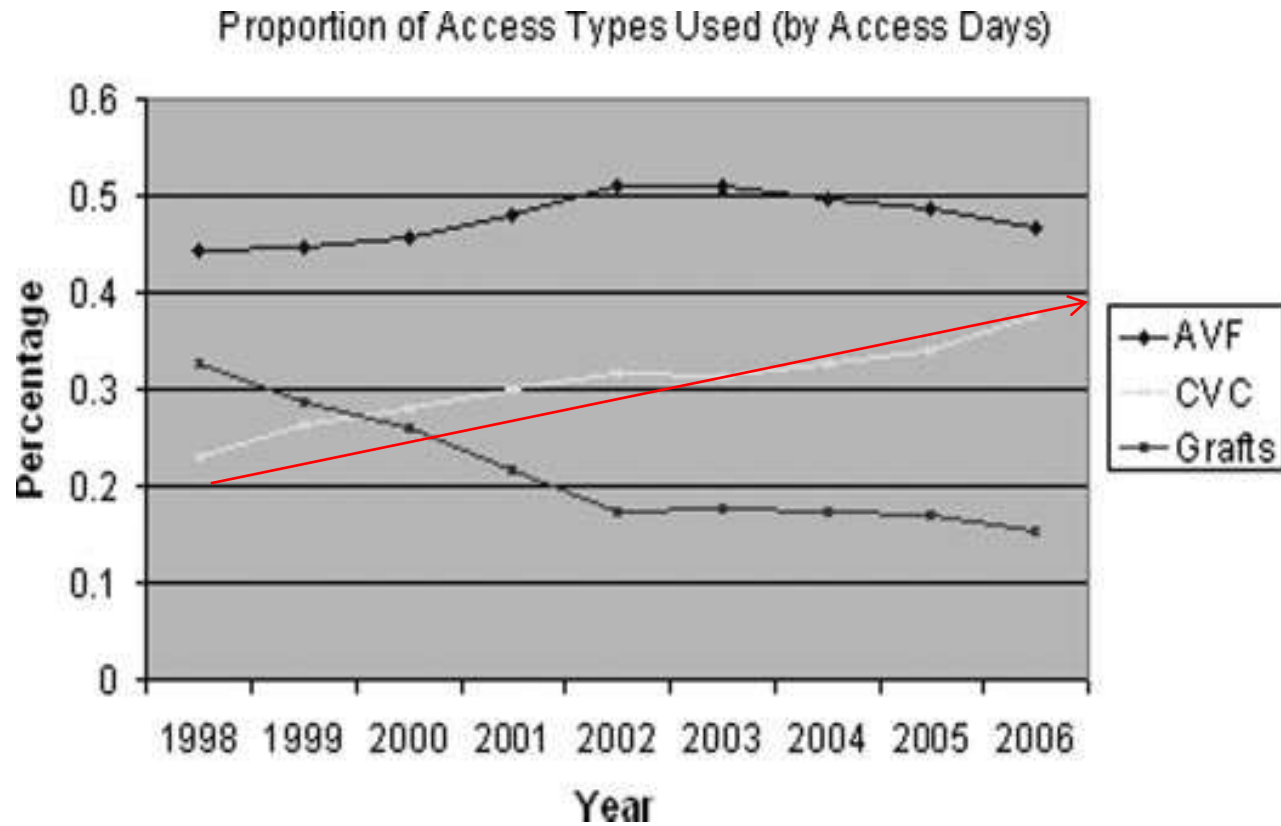


Figure 4. Trend in access use in a university-based hospital.

Approaches to prolong the use of uncuffed CVC: Results of a randomized trial.

METHODS:

- This open-label randomized study:
 - gentamicin/heparin (group A)
 - taurolidine/citrate (group B)
 - control group (heparin) (group C)

RESULTS:

1. CRB episodes developed in 6 and 8 patients in groups A and B,
2. group C (20 patients).
3. **CRB-free catheter survival at 90 days was 82% for A and 78% for B and 26% for C**

CONCLUSIONS:

Gentamicin/heparin and taurolidine/citrate, used for locking UC, were similarly effective at preventing CRB and catheter thrombosis for up to 3 months



Filiopoulos V et al Am J Nephrol. 2011;33(3):260-8.



Barriers to Optimal Vascular Access

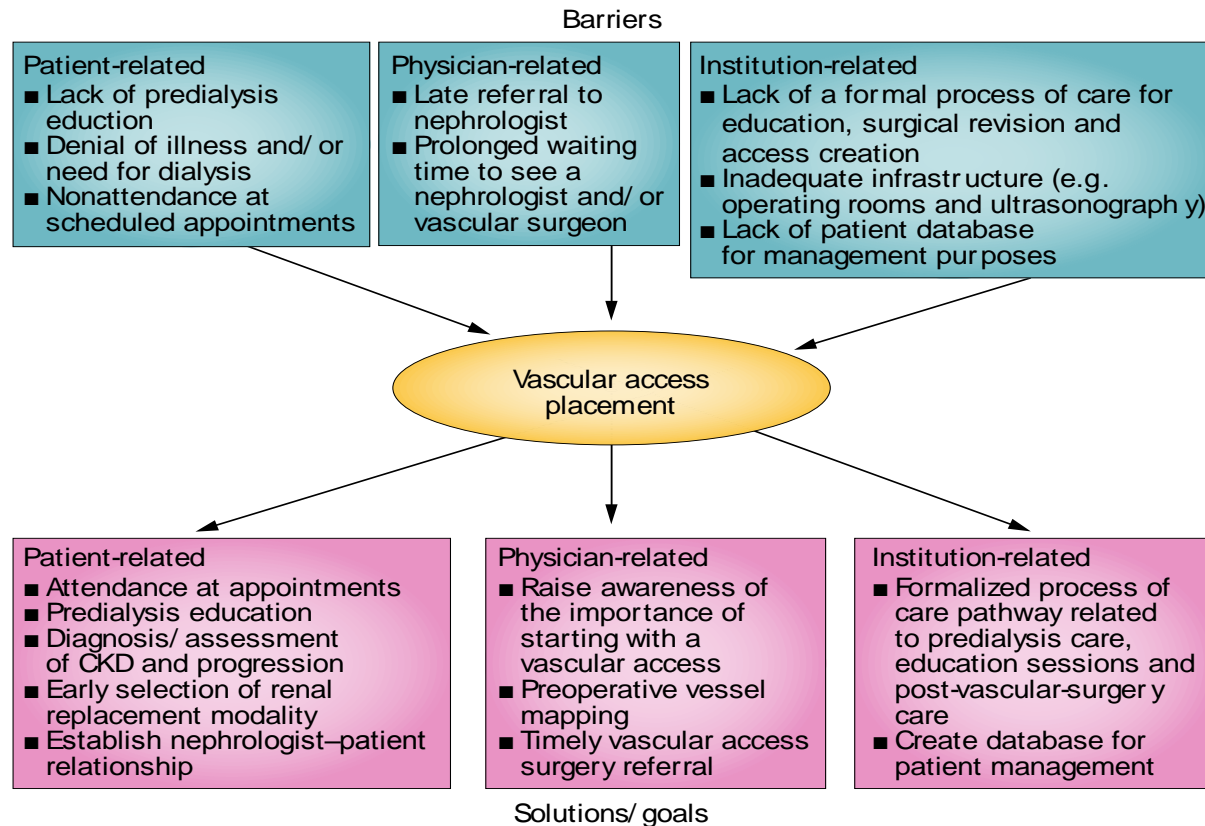


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Clinical Governance Cycle

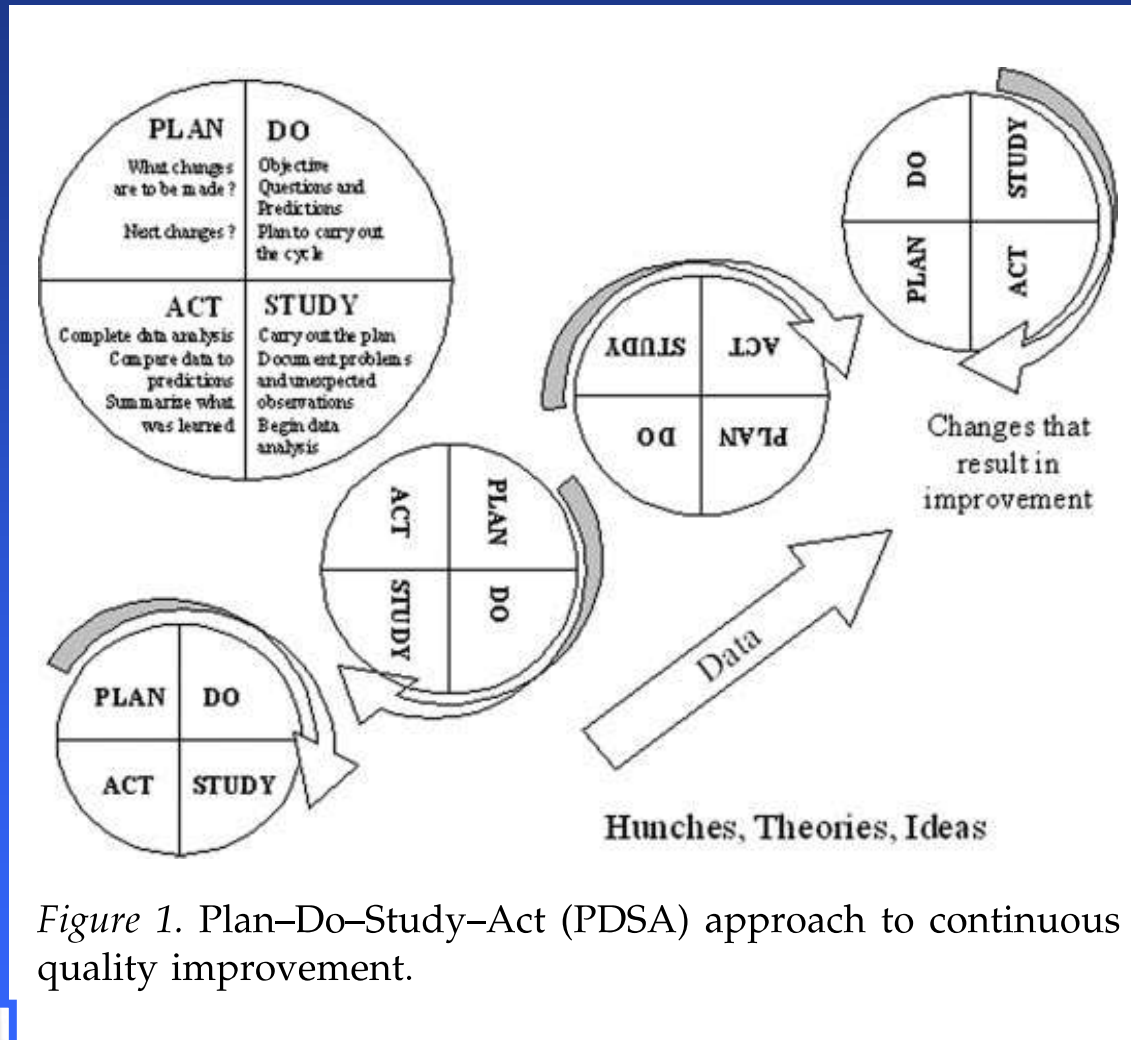


Figure 1. Plan-Do-Study-Act (PDSA) approach to continuous quality improvement.

PDSA

Plan: FFI/Safe Vascular Access

Do:

Timing AVF Insertion

Train Surgeons

Train Physicians

Study: Outcomes/Unit/National Registry

Act: Improve Service Provisions



Meeting the 2012 QIP (Quality Incentive Program) Clinical Measures: Strategies for Dialysis Centers



Further Discussion...



<http://www.gkaonlineacademy.com/forum>

